

Statewide Standards for Timber Harvesting in Shoreland Areas

A report of the Department of Conservation's Maine Forest Service

To the

Joint Standing Committee on Agriculture, Conservation and Forestry

Submitted in compliance with Resolves, Chapter 101 of the 120th Legislature

18February, 2003

LIST OF RECOMMENDATIONS



DEPARTMENT OF CONSERVATION

Maine Forest Service

Forest Policy and Management Division

22 State House Station

Augusta, ME 04333-0022

LIST OF KEY RECOMMENDATIONS IN THE REPORT

General recommendations

- 1 - MFS recommends that the Legislature pursue adoption of statewide standards for timber harvesting in shoreland areas, as outlined in the following recommended standards and contingent upon the resolution of several key issues, identified below.
- 2 - MFS recommends that the standards not take effect until at least 6 months after a critical mass of towns adopts them. The same timeline would apply to the LURC jurisdiction. MFS would like to discuss the implementation timeline with the committee to resolve key issues such as what constitutes a “critical mass.”
- 3 - Although legitimate differences exist between the regulations governing timber harvesting in shoreland areas in the jurisdictions of the DOC’s Land Use Regulation Commission (LURC)¹ and the Department of Environmental Protection (DEP)², many differences can be and should be reconciled.
- 4 - If adequate resources are maintained in the agency, MFS is the logical agency to enforce a statewide standard. MFS does not support having primary enforcement responsibility unless the differences in regulations identified in this report are reconciled and a significant number of municipalities adopt the recommended standards.
- 5 - If the Legislature accepts these recommendations, the following titles and sections of existing laws and rules will require change:
 - 38 MRSA, § 439-A, sub-§ 5 (repeal)
 - 38 MRSA, § 436-A, sub-§ 11-A (amendment)
 - 38 MRSA, § 436-A, sub-§ 13 (amendment)
 - 38 MRSA, § 480-B, sub-§ 2-B (amendment)
 - 38 MRSA, § 480-B, sub-§ 9 (amendment)
 - 38 MRSA, § 480-E2, (new, delegation of authority to MFS)
 - 38 MRSA, § 480-Q, sub-§ 7-A (amendment)
 - 38 MRSA, § 480-R, sub-§ 2 (amendment)
 - 12 MRSA, § 685-C, sub-§ 8 (amendment)
 - 12 MRSA, § 8868, (amendment)
 - Land Use Regulation Commission Rules and Standards, Section 10.01 (amendment)
 - Land Use Regulation Commission Rules and Standards, Section 10.17 (amendment)
 - Department of Environmental Protection Chapter 1000 Rules (amendment)
 - Department of Environmental Protection Chapter 305 Rules (amendment)

¹ Aka the unorganized towns.

² Aka the organized towns.

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- 6 - MFS proposes to develop amendments first to the DEP's Shoreland Zoning Guidelines (Chapter 1000 Rules) to facilitate municipal adoption.
- 7 - MFS recommends providing municipalities with two options to achieve statewide consistency:
 - w Either repeal the sections of existing shoreland zoning ordinances that govern timber harvesting and cede enforcement authority to MFS (preferred); or,
 - w Amend existing shoreland zoning ordinances to bring the ordinances into conformity with the recommended statewide standards.

If a municipality chooses to amend its existing ordinance to be consistent with the recommended statewide standards, MFS would provide enforcement and technical assistance to municipalities, or, by memorandum of agreement, would enforce the timber harvesting provisions of the ordinance. These services would not be available to municipalities that chose to retain their existing ordinances or to adopt ordinances not in conformity with the recommended statewide standards.

- 8 - MFS recommends that the standards not take effect until 6 months after a critical mass of towns adopts them.
- 9 - If the Legislature adopts the recommendations of this report, MFS strongly urges the Legislature not to make further changes to the standards during the implementation period.

Recommendations for specific standards

- 1 - **Purpose Statement:** "The purpose of this rule is to establish statewide standards for timber harvesting activities in shoreland areas throughout the state; to resolve inconsistencies among existing standards; to provide maximum opportunity for flexibility; to protect public resources while minimizing impacts on private resources; to further the maintenance of safe and healthful conditions; to prevent and control water pollution from various agents, including sediment, temperature, toxic materials, and excessive nutrient inputs; to maintain shoreline stability; to protect fish spawning grounds, aquatic life, bird and other wildlife habitat; to protect freshwater and coastal wetlands; and to conserve natural beauty, ~~and open space,~~ and public recreational values.

The agency's emphasis in applying this rule is to educate and seek continuous improvement among the regulated community to prevent and avoid violations before they occur, and to provide standards by which the regulated community will comply and properly interpret the rules. Enforcement of this rule will include a range of actions depending on the severity and number and occurrences of infractions and the consideration of good-faith efforts to comply with this rule."

- 2 - **Definitions:** MFS recommends that the definitions of terms in any new rules and amended rules and laws be standardized.

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- 3 - **Shoreland areas:** MFS recommends maintaining – in large part – the existing regulatory thresholds, as defined below.

“Shoreland area means all land areas within:

A. 250 feet, horizontal distance, of the normal high water mark of streams below the 50 square mile drainage point in the LURC jurisdiction (aka P-SL1), below the 25 square mile drainage point in the DEP jurisdiction, and ponds and freshwater wetlands 10 acres or larger, any coastal or tidal wetland, or any size pond or freshwater wetland rated as significant wildlife habitat or essential wildlife habitat statewide.

B. 75 feet, horizontal distance, of the normal high water mark of streams between the 300 acre drainage point and the 50 square mile drainage point in the LURC jurisdiction, between the beginning of second order streams and the 25 square mile drainage point in the DEP jurisdiction.

C. The immediate vicinity of the normal high water mark of streams above the 300 acre drainage point in the LURC jurisdiction, above the beginning of second order streams in the DEP jurisdiction, and ponds or freshwater wetlands larger than 4,300 square feet but less than 10 acres that are not rated as significant wildlife habitat or essential wildlife habitat in both jurisdictions.

- 4 - **Slash treatment:** MFS recommends that the following standards be applied statewide:

- w No accumulation of slash shall be left within 50 feet of the normal high water mark of a water body protected by the P-SL1 and P-GP Protection Subdistricts, and tidal waters in the LURC jurisdiction; and Great Ponds, rivers, and wetlands larger than 10 acres, and tidal waters in the DEP jurisdiction. Slash used to protect soil from disturbance by equipment or to stabilize exposed soil may be left in place.
- w Between 50 feet and 250 feet of the normal high water mark of a water body identified in (1) above, all slash larger than 3 inches in diameter must be disposed of in such a manner that no part thereof extends more than 4 feet above the ground. Slash used to protect soil from disturbance by equipment or to stabilize exposed soil may be left in place.
- w Timber harvesting activities shall be conducted such that slash or debris is not left below the normal high water mark of any water body. This section does not apply to incidental amounts of slash that result from normal timber harvesting activities otherwise in compliance with this section.
- w Slash means the residue, e.g., treetops and branches, left on the ground after a timber harvest.

- 5 - **Tree diameter standards:** MFS recommends that where a timber harvest volume removal limitation applies in both Shoreland Zoning and LURC, the minimum DBH should be standardized at 4.5 inches.

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- 6 - **Shoreline integrity:** MFS recommends that the following, outcome based standard apply statewide:

“Timber harvesting activities in shoreland areas must take reasonable measures to avoid the occurrence of sedimentation of water and the disturbance of stream banks, stream channels, shorelines, and soil lying within ponds and wetlands. If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.”

- 7 - **Shade and tree retention standards:** Based on careful consideration of the available scientific literature, existing standards, and the concerns of all interests, MFS makes the following recommendations. Because the recommendations differ slightly between the LURC and DEP jurisdictions, the recommendations are shown for each.

LURC jurisdiction

A. Timber harvesting activities in shoreland areas of P-SL1 streams (250 foot buffer), P-SL2 streams below the 25 square mile drainage point (75 foot buffer), all ponds and wetlands 10 acres and larger and tidal waters (250 foot buffer) must leave adequate tree cover and shall be conducted so that a well-distributed stand of trees is retained. For the purposes of this section, adequate tree cover is defined as one of the following three options:

1. Harvesting of no more than 40 percent of the total volume on each acre involved of trees 4.5 inches DBH or greater in any 10 year period is permitted. The residual stand must be windfirm, and a well-distributed stand of trees and other vegetation, including existing ground cover, must be maintained. For the purposes of these standards volume may be considered to be equivalent to basal area; or
2. The residual stand must be windfirm and contain an average basal area of at least 60 square feet per acre of woody vegetation greater than or equal to 1.0 inch DBH, of which 40 square feet per acre must be greater than or equal to 4.5 inches DBH; or
3. An alternative method proposed in an application, signed by a Licensed Professional Forester or certified wildlife professional, from the landowner or designated agent to the Bureau and approved by the Bureau, that provides equal or better protection of the shoreland area than these rules.

Landowners must designate on the Forest Operations Notification form required by 12 MRSA, chapter 805, subchapter 5 which option they choose to use. If landowners choose Option 1 or Option 2, compliance with this section will be determined solely on the criteria for those options. If landowners choose Option 3, timber harvesting activities may not begin until the bureau has approved the required application.

In addition, for Options 1 and 2 above, within 75 feet, horizontal distance, of the normal high water mark of shoreland areas regulated under this section, there must be no cleared openings and a well-distributed stand of trees and other vegetation,

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including existing ground cover, must be maintained. At distances greater than 75 feet, horizontal distance, of the normal high water mark, timber harvesting activities must not create single cleared openings greater than 14,000 square feet in the forest canopy. Where such openings exceed 10,000 square feet, they must be at least 100 feet apart. Such cleared openings will be included in the calculation of total volume removal. For the purposes of these standards volume may be considered to be equivalent to basal area.

B. Timber harvesting activities in shoreland areas of P-SL2 streams below the 300 acre drainage point but above the 25 square mile drainage point, and of all ponds and wetlands larger than 4,300 square feet but less than 10 acres (75 foot buffer) must be conducted to retain sufficient vegetation to maintain shading of surface waters.

DEP jurisdiction

A. Timber harvesting activities in shoreland areas of streams and rivers below the beginning of second order streams (75 foot buffer to the 25 square mile drainage point, 250 foot buffer below), ponds and wetlands 10 acres and larger and tidal waters (250 foot buffer) must leave adequate tree cover and shall be conducted so that a well-distributed stand of trees is retained. For the purposes of this section, adequate tree cover is defined as one of the following three options:

1. Selective cutting of no more than 40 percent of the total volume on each acre involved of trees 4.5 inches DBH or greater in any 10 year period is permitted. The residual stand must be windfirm, and a well-distributed stand of trees and other vegetation, including existing ground cover, must be maintained. For the purposes of these standards volume may be considered to be equivalent to basal area; or
2. The residual stand must be windfirm and contain an average basal area of at least 60 square feet per acre of woody vegetation greater than or equal to 1.0 inch DBH, of which 40 square feet per acre must be greater than or equal to 4.5 inches DBH; or
3. An alternative method proposed in an application, signed by a Licensed Professional Forester or certified wildlife professional, from the landowner or designated agent to the Bureau and approved by the Bureau, that provides equal or better protection of the shoreland area than these rules.

Landowners must designate on the Forest Operations Notification form required by 12 MRSA, chapter 805, subchapter 5 which option they choose to use. If landowners choose Option 1 or Option 2, compliance with this section will be determined solely on the criteria for those options. If landowners choose Option 3, timber harvesting activities may not begin until the bureau has approved the required application.

In addition, for Options 1 and 2 above, within 75 feet, horizontal distance, of the normal high water mark of shoreland areas regulated under this section, there must be no cleared openings and a well-distributed stand of trees and other vegetation, including existing ground cover, must be maintained. At distances greater than 75

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feet, horizontal distance, of the normal high water mark, timber harvesting activities must not create single cleared openings greater than 14,000 square feet in the forest canopy. Where such openings exceed 10,000 square feet, they must be at least 100 feet apart. Such cleared openings will be included in the calculation of total volume removal. For the purposes of these standards, volume may be considered to be equivalent to basal area.

Timber harvesting in shoreland areas of streams between the 300 acre drainage point and the beginning of second order streams and wetlands larger than 4,300 square feet but less than 10 acres (75 foot buffer) must be conducted to retain sufficient vegetation to maintain shading of surface waters. Where the 300 acre drainage point extends below the beginning of second order streams, this section shall apply.

8 - Skid trails and equipment operation: MFS makes the following recommendations for standards in both the LURC and DEP jurisdictions.

A. STREAM CHANNELS. Timber harvesting equipment shall not use stream channels as travel routes except when:

1. Surface waters are frozen and snow covered; and
2. The activity will not result in any ground disturbance.

B. DESIGN, CONSTRUCTION, AND CLOSEOUT. Skid trails must be designed, constructed, and either revegetated or stabilized to prevent sediment and concentrated water runoff from directly entering the water body.

C. FILTER STRIPS.

1. Except for stream crossings, sites where equipment operates, including but not limited to skid trails, must be located or designed to prevent the exposure of mineral soil within at least 25 feet of any water body or wetland regulated under this chapter. On slopes of 10 percent or greater, the setback for equipment operation must be increased by at least 20 feet, plus an additional 10 feet for each 5 percent increase in slope above 10 percent, but in no case may the setback be less than that indicated in the slope table presented in Appendix 3.
2. The provisions of this subsection apply only to a face sloping toward the water body or freshwater or coastal wetland, provided, however, that no portion of such exposed mineral soil on a back face is closer than 25 feet from the normal high water mark of a water body or upland edge of a freshwater or coastal wetland. The requirements of this subsection shall not apply to skid trail approaches to stream crossings.
3. Where such filter strip is impracticable, appropriate techniques shall reasonably be used to avoid sedimentation of the water body or wetland. Such techniques may include the installation of sump holes or settling basins, and/or the effective use of additional ditch relief culverts and ditch water turnouts placed to avoid sedimentation of the water body or wetland. If,

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despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.

- D. Skid Trail means a route repeatedly used by forwarding machinery or animal to haul or drag forest products from the stump to the yard or landing, with minimal excavation or new excavation (if on a pre-existing road).
- E. Exception. Timber harvesting activities in shoreland areas of streams draining less than 300 acres and wetlands adjacent to such streams may be conducted in a manner not in conformity with the requirements of the foregoing subsections provided that such activities are reasonably conducted to avoid the occurrence of sedimentation of water. If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.

9 - **Land management roads:** MFS makes the following recommendations for standards in both the LURC and DEP jurisdictions.

Land management roads must be designed, constructed, and maintained to meet the following standards.

- A. Road design, construction, and maintenance. Land management roads, including approaches to stream crossings, ditches and other related structures, must be designed, constructed, and maintained to prevent sediment and concentrated water runoff from directly entering the water body or tributary stream.
- B. Setbacks. Land management roads and associated ditches, excavation, and fill must be set back at least:
 - 1. 100 feet from the normal high-water mark of a Great Pond or a river that flows to a Great Pond, P-SL1 streams in the LURC jurisdiction, rivers and streams draining more than 25 square miles in the DEP jurisdiction, ponds and freshwater wetlands 10 acres or larger, any coastal or tidal wetland, or any size pond or freshwater wetland rated as significant wildlife habitat or essential wildlife habitat statewide;
 - 2. 50 feet from the normal high water mark of streams draining more than 300 acres but less than 50 square miles in the LURC jurisdiction and rivers and streams below the 300 acre drainage but above the 25 square mile drainage point in the DEP jurisdiction; and,
 - 3. 25 feet from the normal high water mark of streams draining less than 300 acres and ponds or freshwater wetlands larger than 4,300 square feet but less than 10 acres that are not rated as significant wildlife habitat or essential wildlife habitat in both jurisdictions.
- 4. Exceptions.
 - a. The minimum 100 foot setback specified in subsection 1 may be reduced to no less than 50 feet, if, prior to construction, the landowner or the landowner's designated agent makes a clear demonstration to the Bureau that no reasonable alternative exists and that appropriate techniques will

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be used to prevent sedimentation of the water body. Such techniques may include, but are not limited to, the installation of settling basins, and/or the effective use of additional ditch relief culverts and turnouts placed to avoid sedimentation of the water body. If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.

- b. The minimum 50 foot setback specified in subsection 2 may be reduced to no less than 25 feet, if, prior to construction, the landowner or the landowner's designated agent makes a clear demonstration to the Bureau that no reasonable alternative exists and that appropriate techniques will be used to prevent sedimentation of the water body. Such techniques may include, but are not limited to, the installation of settling basins, and/or the effective use of additional ditch relief culverts and turnouts placed to avoid sedimentation of the water body. If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.
- 5. On slopes of 10 percent or greater, the land management road setback must be increased by at least 20 feet, plus an additional 10 feet for each 5 percent increase in slope above 10 percent, but in no case may the land management road setback be less than that indicated in the slope table presented in Appendix 3.
- 6. New permanent land management roads are not permitted within the shoreland area along Significant River Segments as identified in 38 MRSA, Chapter 3, Sub-Chapter 1, Article 2-B, nor in Resource Protection Districts as identified in municipal shoreland zoning ordinances, unless, prior to construction, the landowner or the landowner's designated agent makes a clear demonstration to the Bureau that no reasonable alternative route exists outside the shoreland zone, and that the new road must be set back as far as practicable from the normal high water mark and screened from the river by existing vegetation.
- C. Maintenance. Ditches, culverts, bridges, dips, water turnouts and other water control installations associated with roads must be maintained on a regular basis to assure effective functioning. Drainage structures shall, at a minimum, deliver a dispersed flow of water into an unscarified filter strip no less than the width indicated in the slope table set forth in [Appendix 3].

Where such filter strip is impracticable, appropriate techniques shall reasonably be used to avoid sedimentation of the water body or wetland. Such techniques may include the installation of sump holes or settling basins, and/or the effective use of additional ditch relief culverts and ditch water turnouts placed reasonably to avoid sedimentation of the water body or wetland. If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.

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- D. Road closeout and discontinuance. Maintenance of the water control installations required above must continue until the road is discontinued and put to bed by effective installation of water bars or other adequate road drainage structures at appropriate intervals, constructed to reasonably avoid surface water flowing over or under the water bar, and extending sufficient distance beyond the traveled way so that water does not reenter the road surface.
- E. Upgrading existing roads. Extension or enlargement of presently existing roads must conform with the provisions of this section. Any nonconforming existing road may continue to exist and be maintained, as long as the nonconforming conditions are not made more nonconforming.

Exception: Extension or enlargement of presently existing roads need not conform to the setback requirements of subsections 4.a. and 4.b. if, prior to extension or enlargement, the landowner or the landowner's designated agent makes a clear demonstration to the Bureau that no reasonable alternative exists and that appropriate techniques will be used to prevent sedimentation of the water body. Such techniques may include, but are not limited to, the installation of settling basins, and/or the effective use of additional ditch relief culverts and turnouts placed to avoid sedimentation of the water body. If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.

- F. Additional measures. In addition to the foregoing minimum requirements, reasonable provision must otherwise be made in the construction and maintenance of roads and stream crossings to avoid sedimentation of surface waters.
 - G. Notice to Bureau. Written notice of all land management road and water crossing construction activities related to timber harvesting activities in shoreland areas regulated under this chapter must be given to the Bureau prior to the commencement of such activities. Such notice must conform to the requirements of the Bureau.
 - H. Definition: Land Management Road means a route or track having a profile that requires the control of water flow and consisting of a bed of exposed mineral soil, gravel, or other surfacing materials constructed for, or created by, the passage of motorized vehicles and used primarily for timber harvesting activities, including associated log yards, but not including skid trails or skid roads.
- 10 - **Stream and wetlands crossings:** MFS recommends the following standards.

SKID TRAIL STREAM CROSSINGS

A. Design and Construction

- 1. All temporary crossings of streams and rivers below the 25 square mile drainage point require a bridge or culvert sized at according to the requirements of subsection B below.

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2. Streams above the 25 square mile drainage point may be crossed using temporary structures that are not bridges or culverts but which meet the requirements of the following section; or
 - a. when stream channels are frozen and snow-covered; or
 - b. when stream channels are composed of a hard surface which will not be eroded or otherwise damaged.
3. All skid trail or skid road crossings of streams must be designed, constructed, and maintained, such that:
 - a. sedimentation of surface waters is reasonably avoided;
 - b. there is no substantial disturbance of the stream bank or stream channel; and,
 - c. fish passage is not impeded.
- B. Bridge and Culvert Sizing. The following requirements apply to skid trail or skid road stream crossings when surface waters are unfrozen:
 1. Bridges and culverts must be installed and maintained to provide an opening sufficient in size and structure to accommodate 10 year frequency water flows or with a cross-sectional area at least equal to 2 1/2 times the cross-sectional area of the stream channel.
 2. Bridge and culvert sizes may be smaller than provided in subsection 1 if techniques are effectively employed such that in the event of culvert or bridge failure, the natural course of water flow is maintained and sedimentation of the water body is avoided. Such techniques may include, but are not limited to, the effective use of any or all of the following:
 - a. use of temporary skidder bridges;
 - b. removing culverts prior to the onset of frozen ground conditions;
 - c. using water bars in conjunction with culverts; or,
 - d. using road dips in conjunction with culverts.
 3. Culverts utilized in stream crossings must:
 - a. be installed at or below stream bed elevation;
 - b. be seated on firm ground;
 - c. have soil compacted at least halfway up the side of the culvert;
 - d. be covered by soil to a minimum depth of 1 foot or according to the culvert manufacturer's specifications, whichever is greater; and
 - e. have a headwall at the inlet end which is adequately stabilized by rip-rap or other suitable means to reasonably avoid erosion of material around the culvert.
 4. Stream crossings allowed under this section but located in flood hazard areas (i.e. A zones) as identified on a community's Flood Insurance Rate Maps

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(FIRM) or Flood Hazard Boundary Maps (FHBM) must be designed and constructed under the stricter standards contained in that community's National Flood Insurance Program (NFIP). For example, a crossing may be required to pass a 100-year flood event.

- C. Closeout. Upon completion of timber harvesting, or upon the expiration of a Forest Operations Notification, whichever is earlier, bridges and culverts installed for stream crossings by skid roads or skid trails must either comply with the standards for permanent stream crossings by land management roads or be removed, and areas of exposed soil revegetated or stabilized. Structures that are not bridges or culverts are removed immediately following timber harvesting, or, if frozen into the stream bed or bank, as soon as practical after snowmelt. Stream channels, banks and approaches to crossings of water bodies must be immediately stabilized on completion of harvest, or if the ground is frozen and/or snow-covered, as soon as practical after snowmelt. If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.
- D. Nonforested wetlands. Skid trail crossings of nonforested wetlands, other than those areas below the normal high water mark of stand or flowing waters, must avoid non-forested wetlands and must maintain the existing hydrology of non-forested wetlands, unless there are no reasonable alternatives, as determined by the Bureau.
- E. Exception. Timber harvesting activities in shoreland areas of streams draining less than 300 acres and wetlands adjacent to such streams may be conducted in a manner not in conformity with the requirements of the foregoing subsections provided that such activities are reasonably conducted to avoid the occurrence of sedimentation of water. If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.

LAND MANAGEMENT ROAD STREAM CROSSINGS

- A. Design, construction, and maintenance. Land management road stream crossings, including approaches to stream crossings, ditches and other related structures, must be designed, constructed, and maintained to prevent sediment and concentrated water runoff from directly entering the water body or tributary stream.
- B. Bridge and culvert sizing. The following requirements apply to land management road stream crossings.
 - 1. Bridges and culverts must be installed and maintained to provide an opening sufficient in size and structure to accommodate 10 year frequency water flows or with a cross-sectional area at least equal to 2 1/2 times the cross-sectional area of the stream channel.
 - 2. Bridge and culvert sizes may be smaller than provided in subsection 1 if techniques are effectively employed such that in the event of culvert or bridge failure, the natural course of water flow is maintained and sedimentation of

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- the water body is avoided. Such techniques may include, but are not limited to, the effective use of any or all of the following:
- a. removing culverts prior to the onset of frozen ground conditions;
 - b. using water bars in conjunction with culverts; or,
 - c. using road dips in conjunction with culverts.
3. Culverts utilized in stream crossings must:
- a. be installed at or below stream bed elevation;
 - b. be seated on firm ground;
 - c. have soil compacted at least halfway up the side of the culvert;
 - d. be covered by soil to a minimum depth of 1 foot or according to the culvert manufacturer's specifications, whichever is greater; and
 - e. have a headwall at the inlet end which is adequately stabilized by rip-rap or other suitable means to reasonably avoid erosion of material around the culvert.
4. Stream crossings allowed under this section but located in flood hazard areas (i.e. A zones) as identified on a community's Flood Insurance Rate Maps (FIRM) or Flood Hazard Boundary Maps (FHBM) must be designed and constructed under the stricter standards contained in that community's National Flood Insurance Program (NFIP). For example, a crossing may be required to pass a 100-year flood event.
- C. Road closeout and discontinuance. Maintenance of the water control installations required above must continue until the road is discontinued and put to bed. Upon completion of timber harvesting, or upon the expiration of a Forest Operations Notification, whichever is earlier, areas of exposed soil must be revegetated or stabilized. Stream channels, banks and approaches must be immediately stabilized on completion of harvest, or if the ground is frozen and/or snow-covered, as soon as practical after snowmelt. Crossings on discontinued roads must be put to bed by taking the following actions:
1. Crossing structures must be appropriately sized or dismantled and removed in a manner that reasonably avoids sedimentation of the water body.
 2. Any bridge or water crossing culvert in roads to be discontinued shall satisfy one of the following requirements:
 - a. it shall be designed to provide an opening sufficient in size and structure to accommodate 25 year frequency water flows;
 - b. it shall be designed to provide an opening with a cross-sectional area at least 3 1/2 times the cross-sectional area of the stream channel; or
 - c. it shall be dismantled and removed in a fashion so as to reasonably avoid sedimentation of the water body.

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If, despite such precautions, sedimentation or the disruption of shoreline integrity occurs, such conditions must be corrected by the responsible party.

- D. Notice to Bureau. Written notice of all land management road and water crossing construction activities related to timber harvesting activities in shoreland areas regulated under this chapter must be given to the Bureau prior to the commencement of such activities. Such notice must conform to the requirements of the Bureau.
- E. Non-forested Wetlands. In addition to all requirements of this section, any timber harvesting activity involving the design, construction, and maintenance of land management roads through non-forested wetlands, other than those areas below the normal high water mark of standing or flowing waters, may require a permit from LURC, DEP, or the US Army Corps of Engineers.

The design and construction of land management road systems through non-forested wetlands, other than those areas below the normal high water mark of standing or flowing waters, must avoid non-forested wetlands and must maintain the existing hydrology of non-forested wetlands, unless there are no reasonable alternatives, as determined by the Bureau.

To maintain the existing hydrology of non-forested wetlands, road drainage designs must provide cross drainage of the water on the surface and in the top 12 inches of soil in non-forested wetlands during both flooded and low water conditions so as to neither create permanent changes in wetland water levels nor alter wetland drainage patterns. This must be accomplished through the incorporation of culverts or porous layers at appropriate levels in the road fill to pass water at its normal level through the road corridor. Where culverts or other cross-drainage structures are not used, all fills must consist of free draining granular material.

ALL CROSSINGS

- A. Determination of flow. Provided they are properly applied and used for the circumstances for which they are designed, methods including but not limited to the following are acceptable to the Bureau as means of calculating the 10 year and 25 year frequency water flows and thereby determining crossing sizes as required in this section:

The United States Geological Survey (USGS) Methods; specifically: Hodgkins, G. 1999. Estimating the Magnitude of Peak Flows for Streams in Maine for Selected Recurrence Intervals. U.S. Geological Survey. Water Resources Investigations Report 99-4008. 45 pp.

- B. Upgrading existing crossings. Extension or enlargement of presently existing crossings must conform to the provisions of this section. Any nonconforming existing crossing may continue to exist and be maintained, as long as the nonconforming conditions are not made more nonconforming.